IN THE CLAIMS:

1. (Currently Amended) A plasma processing method comprising the steps of:

placing a substrate inside a reaction chamber of a plasma processing system, a silicon ~~dioxide~~ oxide film and a resist pattern having been formed in order on the surface of the substrate;

introducing an etching gas composed of a fluorocarbon gas into the reaction chamber, ~~wherein the fluorocarbon gas is composed of at least one of C_4F_6, C_5F_8, and C_6F_6 gases~~ the fluorocarbon gas includes carbon and fluorine, and C/F is 0.5 or more; and

creating a plasma from the etching gas and etching the silicon ~~dioxide~~ oxide film with the plasma and using the resist pattern as a mask,

wherein a residence time τ of the fluorocarbon gas in the reaction chamber is controlled at a value greater than 0.1 sec and equal to or less than 1 sec, so that the selectivity of the etching rate of the silicon oxide film with respect to the etching rate of the resist pattern is 2 or more, the residence time τ being given by $P \times V/Q$, where P is a pressure (unit: Pa) of the fluorocarbon gas, V is a volume (unit: L) of the reaction chamber and Q is a flow rate (unit: Pa · L/sec) of the fluorocarbon gas.

2. (Cancelled)

3. (Original) The plasma processing method of Claim 1, wherein the residence time τ is controlled by a mass flow controller provided for the plasma processing system and/or a valve and a pump provided for the plasma processing system.

4. (Currently amended) A plasma processing method comprising the steps of:

placing a substrate inside a reaction chamber of a plasma processing system, a silicon ~~dioxide~~ oxide film having been formed on the surface of the substrate;

introducing an etching gas composed of a fluorocarbon gas into the reaction chamber, ~~wherein~~ the fluorocarbon gas ~~is composed of at least one of C_4F_6, C_5F_8, and~~

~~C_6F_6 gases~~ includes carbon and fluorine, and C/F is 0.5 or more; and

creating a plasma from the etching gas and etching the silicon ~~dioxide~~ oxide film with the plasma and using the resist pattern as a mask,

wherein a parameter E = $P \times W_0/Q$ (P is a pressure (unit: Pa) of the fluorocarbon gas, W_0 is a flow rate (unit: Pa • L/sec) of the fluorocarbon gas) is controlled at a value greater than $0.8 \times [10_4]$ 10^4 sec • W/m^3 and equal to or less than 8×10^4 sec • W/m^3, ~~P×W/Q being a product of a residence time τ of the fluorocarbon gas in the reaction chamber and a power density Pi of power applied to create the plasma, the residence time τ being given by P×V/Q, where P is a pressure (unit: Pa) of the fluorocarbon gas, V is a volume (unit: L) of the reaction chamber and Q is a flow rate (unit: Pa · L/sec) of the fluorocarbon gas, the power density Pi being given by W_0/V, where W_0 is a magnitude (unit: W) of the power and V is the volume (unit: L) of the reaction chamber~~ so that the selectivity of the etching rate of the silicon oxide film with respect to the etching rate of the resist pattern is 2 or more, without considering the volume of the reaction chamber in the plasma processing system.

5. (Cancelled)

6. (Currently Amended) The plasma processing method of Claim 4, wherein the [[residence time τ]] parameter E is controlled by a mass flow controller provided for the plasma processing system and/or a valve and a pump provided for the plasma processing system.

Claims 7-8 (Cancelled).

9. (Currently amended) The plasma processing method of Claim [[13]] 19, wherein the [[residence time τ]] parameter E is controlled by a mass flow controller provided for the plasma processing system and/or a valve and a pump provided for the plasma processing system.

10. (Currently amended) A plasma processing method comprising the steps

of:

placing a substrate inside a reaction chamber of a plasma processing system;

introducing a fluorocarbon gas into the reaction chamber, ~~wherein~~ the fluorocarbon gas ~~is composed of at least one of C_4F_6, C_5F_8 and C_6F_6 gases~~ includes carbon and fluorine, and C/F is 0.5 or more; and

creating a plasma from the fluorocarbon gas and depositing an organic film on the substrate using the plasma,

wherein a parameter E = $P \times W_0/Q$ (P is a pressure (unit: Pa) of the fluorocarbon gas, W^0 is a magnitude (unit: W) of the power applied to create the plasma and Q is a flow rate (unit: Pa • L/sec) of the fluorocarbon gas) is controlled at 0.8×10^4 sec • W/m^3 or less, ~~$P \times W_0/Q$ being a product of a residence time τ of the fluorocarbon gas and a power density Pi of power applied to create the plasma, the residence time τ being given by $P \times V/Q$, where P is a pressure (unit: Pa) of the fluorocarbon gas, V is a volume (unit: L) of the reaction chamber and Q is a flow rate (unit : Pa · L/sec of the fluorocarbon gas, the power density Pi being given by W_0/V, where W_0 is a magnitude (unit: W) of the power and V is 'the volume (unit: L) of the reaction chamber~~ without considering the volume of the reaction chamber in the plasma processing system.

11. (Cancelled).

12. (Original) The plasma processing method of Claim 10, wherein the residence time τ is controlled by a mass flow controller provided for the plasma processing system and/or a valve and a pump provided for the plasma processing system.

Claims 13-18 (Cancelled).

[[13]] 19. (Currently Amended) A plasma processing method comprising the steps of:

placing a substrate inside a reaction chamber of a plasma processing system, a silicon ~~dioxide~~ oxide film having been formed on the surface of the substrate;

introducing a first fluorocarbon gas into the reaction chamber, ~~wherein~~ the first

fluorocarbon gas ~~is composed of at least one of C_4F_6, C_5F_8, and C_6F_6 gases~~ includes carbon and fluorine, and C/F is 0.5 or more;

creating a first plasma from the first fluorocarbon gas and etching the silicon ~~dioxide~~ oxide film with the first plasma;

introducing a second fluorocarbon gas into the reaction chamber, ~~wherein~~ the second fluorocarbon gas ~~is composed of at least one of C_4F_6, C_5F_8, and C_6F_6 gases~~ includes carbon and fluorine, and C/F is 0.5 or more; and

creating a second plasma from the second fluorocarbon gas and depositing an organic film on the silicon ~~dioxide~~ oxide film with the second plasma,

wherein a residence time τ of the first fluorocarbon gas in the reaction chamber is controlled at a value greater than 0.1 sec and equal to or less than 1 sec, the residence time τ being given $P \times V/Q$, where P is a pressure (unit: Pa) of the first fluorocarbon gas, V is a volume (unit: L) of the reaction chamber and Q is a flow rate (unit: Pa · L/sec) of the first fluorocarbon gas; and

wherein a residence time τ of the second fluorocarbon gas in the reaction chamber is controlled at a value equal to or less than 0.1 sec, the residence time τ being given by $P \times V/Q$.